

Christopher R. Shearer, Ph.D.

Assistant Professor

Department of Civil and Environmental Engineering

South Dakota School of Mines and Technology

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EDUCATION

Georgia Institute of Technology, Atlanta, GA

Ph.D. in Civil Engineering, 2014

Minor: Sustainable Structural Materials

Doctoral Advisor: Kimberly Kurtis

Dissertation Title: *The productive reuse of coal, biomass and co-fired fly ash*

<http://hdl.handle.net/1853/52298>

M.S. in Civil Engineering, 2009

Focus: Structural Engineering

Ohio Northern University, Ada, OH

B.S. in Civil Engineering with High Distinction, 2008

Minor: Business Administration

PROFESSIONAL EXPERIENCE

Assistant Professor, South Dakota School of Mines and Technology, Rapid City, SD, Aug. 2014–present

Research interests include the multi-scale study of the chemical, physical, and mechanical properties and durability performance of infrastructure materials, with a focus on sustainable concrete materials technology. I also research improved pedagogical approaches for engineering with a concentration on active and service learning.

Structural Engineer, URS Corporation, Cleveland, OH, 2007 and 2008

Designed aspects of the concrete foundations and steel frames for multiple power plants around the U.S. Developed a girt-truss system design guide to support components and cladding for buildings.

Engineering Intern, Ohio Department of Transportation, Cleveland, OH, 2006

Inspected a bridge construction and road repavement project, and managed finances for all concrete and asphalt materials.

PAST RESEARCH EXPERIENCE

Research Assistant and Department of Energy Office of Science Graduate Research Fellow, Civil Engineering, Georgia Institute of Technology, 2009-2014

Conducted research on the potential reuses of biomass co-fired fly ash in concrete and geopolymers using analytical techniques including SEM, TGA/DTA, ICP-OES, BET surface area, XRD, XRF, petrography, and calorimetry among others, and a suite of ASTM Standards testing.

Guest Researcher, Oak Ridge National Laboratory, Oak Ridge, TN, 2014

Investigated the structural features formed in alkali-silica reaction gel using the extended Q-range small-angle neutron scattering diffractometer (EQ-SANS) at the Spallation Neutron Source (SNS).

Guest Researcher, National Institute of Standards and Technology, Gaithersburg, MD, 2013

Assessed the rheological behavior of alkali-activated geopolymer gels and cement pastes by measuring and modeling shear stress-shear rate curves.

Advanced Light Source User, Lawrence Berkeley National Laboratory, Berkeley, CA, 2012-2013

Performed X-ray absorption near edge structure (XANES) analyses on biomass co-fired fly ash and geopolymers to generate spatially-resolved elemental images and to determine chemical speciation using three X-ray microscopes: BL 5.3.2.2, 5.3.2.1, and 10.3.2.

National Science Foundation East Asia & Pacific Summer Institutes Fellow, University of Melbourne, Australia, 2011

Research Mentors: John Provis and Susan Bernal

Developed alkali-activated biomass co-fired fly ash geopolymers and used FTIR, TMA, and XRD to characterize fundamental properties of these lab-produced specimens.

CONSULTING EXPERIENCE

Gunderson, Palmer, Nelson & Ashmore, LLP, Rapid City, SD, 2016-2017

Evaluated concrete hazard on human health.

South Dakota Department of Transportation, Pierre, SD, 2016

Performed isothermal calorimetry experiments.

Bailey Associates, Inc., Rapid City, SD, 2016

Concrete foundation mix design.

TEC Services, Inc., Atlanta, GA, 2014

Tested the pozzolanicity of a waste material using TGA.

Metna Co., Atlanta, GA, 2013

Analyzed the early-age reaction kinetics of high-performance cementitious mixtures.

Geosyntec Consultants, Atlanta, GA, 2012

Performed SEM imaging and XRD analysis to investigate the self-hydrating properties of fly ash.

Grace Construction Products, Atlanta, GA, 2010

Conducted a systematic testing series on the sulfate resistance of cement mortars.

TEACHING EXPERIENCE

Engineering & Construction Materials and Laboratory (CEE 316/316L), Instructor, SD Mines

Concrete Theory & Design (CEE 456/556), Instructor, SD Mines

Prestressed Concrete (CEE 652), Instructor, SD Mines

Advanced Concrete Materials (CEE 792), Instructor, SD Mines

Mechanics of Materials (EM 321), Instructor, SD Mines

Structural Analysis I (CEE 3055), Instructor, Georgia Tech, Summer 2014

Civil Engineering Materials (CEE 3020), Teaching Assistant, Georgia Tech, 2008-2009

REFEREED JOURNAL ARTICLES

- 1) Wirth, X., Benkeser, D., Yeboah, N. N., Shearer, C. R., Kurtis, K. E., and Burns, S. E. (2019). Evaluation of Alternative Fly Ashes as Supplementary Cementitious Materials. *ACI Materials Journal*, 116(4), 69-77. <https://doi.org/10.14359/51716712>
- 2) Shearer, C. R., Provis, J. L., Bernal, S. A., and Kurtis, K. E. (2016). Alkali-activation potential of biomass-coal co-fired fly ash. *Cement and Concrete Composites*, 73, 62-74. <https://doi.org/10.1016/j.cemconcomp.2016.06.014>
- 3) Benning, J. L. and Shearer, C. R. (2016). Example of a Vertically Integrated Sustainable Engineering Program, *Journal of Professional Issues in Engineering Education and Practice*, 143(2), D2516001. [https://doi.org/10.1061/\(ASCE\)EI.1943-5541.0000291](https://doi.org/10.1061/(ASCE)EI.1943-5541.0000291)
- 4) Shearer, C. R., and Kurtis, K. E. (2015). Use of Biomass and Co-Fired Fly Ash in Concrete. *ACI Materials Journal*, 112(2). <https://doi.org/10.14359/51686827>
- 5) Yeboah, N. N., Shearer, C. R., Burns, S. E., and Kurtis, K. E. (2014). Characterization of biomass and high carbon content coal ash for productive reuse applications. *Fuel*, 116, 438-447. <https://doi.org/10.1016/j.fuel.2013.08.030>

JOURNAL ARTICLES SUBMITTED AND IN PREPARATION

- 1) Thinley, T. L., Reza, A. N. R., Donnell, K. M., and Shearer C. R., A Synergistic Materials Characterization Approach to Evaluate Microwave Excitation of Geopolymer Precursor Powders. *Powder Technology*. Submitted: 10/2019 (in review)
- 2) Kirkvold, H. A., Castaneda, D. I., Henschen, J. D., and Shearer, C. R., Innovative Pedagogical Approaches for Concrete Durability. *ACI S802 Special Publication*. Submitted: 10/2019 (in review)
- 3) Elahi, M. M. A., Reza, A. N. R.*, and Shearer, C. R., Controlling Aluminate Phase Hydration for Sulfate Attack Resistance of Portland-Limestone Cements. *Proceedings of the Institution of Civil Engineers – Construction Materials*. (invited for special publication; to be submitted 10/2019)
- 4) Elahi, M. M. A. and Shearer, C. R., Influence of Portland-Limestone Cement Composition on Sulfate Attack Performance. *Construction and Building Materials*. (in preparation for Nov. 2019 submission)
- 5) Claggett, N. J. and Shearer, C. R., Mechanical Performance of Macrosynthetic Fiber-Reinforced Shotcrete Mixtures with Fibers of Varying Lengths. *Cement and Concrete Composites*. (in preparation for Nov. 2019 submission)
- 6) Moen, H., Lingwall, B., Kamara, V., Katala, D., Surovek, A., Bardunias, P., Soar, R., and Shearer C. R., An Evaluation of the Mechanical Properties of In-Situ and Reconstituted Termite Mound Soils, *Journal of Geotechnical and Geoenvironmental Engineering*. (in preparation for Jan. 2020 submission)

REFEREED CONFERENCE PUBLICATIONS

- 1) Dymond, B. Z., Shearer C. R., and Swenty, M.K., Different approaches to implementing a laboratory experiment in a reinforced concrete design course, in preparation for *Proceedings of American Society of Engineering Education (ASEE) Annual Conference & Exposition*, Montreal, Quebec, June 20-24, 2020. (abstract submitted 9/2019)
- 2) Elahi, M. M. A. and Shearer, C. R. (2019). Improving the sulfate attack resistance of portland-limestone cement through sulfate optimization: A calorimetry-based approach, *Proceedings of the Fifth International Conference on Sustainable Construction Materials and Technologies*,

Kingston Upon Thames, United Kingdom, July 14-17, 2019.
<http://www.claisse.info/2019%20papers/5052.pdf> (conference award winner)

- 3) Benning, J. Surovek, A., Kellogg, S., and Shearer, C. R., (2018). Engagement in Practice: A Case study on improving community sustainability through service learning. *Proceedings of the 2018 American Society of Engineering Education (ASEE) Annual Conference & Exposition*, Salt Lake City, UT, June 24-27, 2018. <https://peer.asee.org/30378>
- 4) Edwards, C. A., Donnell, K. M., and Shearer, C. R. (2018). Microwave materials characterization of geopolymer precursor powder, *Proceedings of 2018 Institute of Electrical and Electronics Engineers (IEEE) International Instrumentation and Measurement Technology Conference (I2MTC)*, Houston, TX, May 14-17, 2018. <https://doi.org/10.1109/I2MTC.2018.8409709>
- 5) Long, A., Benning, J. Shearer, C. R., Surovek, A., and Kellogg, S. (2017). *Promoting sustainability in engineering through EPICS program, 15th LACCEI International Multi-Conference for Engineering, Education, and Technology Proceedings*, Boca Raton, FL, July 19-21, 2017. <http://dx.doi.org/10.18687/LACCEI2017.1.1.465>
- 6) Writh, X., Shearer, C. R., Burns, S. E., and Kurtis K. E., (2017). Evolution of the properties of organic matter and mineral phases of reclaimed coal fly ash, *World of Coal Ash Conference Proceedings*, Lexington, KY, May 9-11, 2017. <http://www.flyash.info/2017/066-Wirth-woca2017p.pdf>
- 7) Shearer, C. R., Foudazi, A., Hashemi, A., and Donnell, K. M. (2016). Microwave characterization of fly ash geopolymerization, *Proceedings of 2016 Institute of Electrical and Electronics Engineers (IEEE) International Instrumentation and Measurement Technology Conference (I2MTC)*, Taipei, Taiwan, May 23-26, 2016, <https://doi.org/10.1109/I2MTC.2016.7520442>
- 8) Shearer, C. R., Provis, J. L., Bernal, S. A., Kurtis, K. E. (2012). Characterisation of Alkali-activated Co-fired Fly Ash Geopolymers, *Proceedings of the Concrete in the Low Carbon Era International Conference*, Dundee, UK, July 9-11, 2012. <https://discovery.dundee.ac.uk/ws/portalfiles/portal/6514437/proceedings.pdf>
- 9) Shearer, C. R., Yeboah, N. N. N., Burns, S. E., Kurtis, K. E. (2012). Evaluation of Biomass Fired and Co-fired Fly Ash for Alkali-Silica Reaction Mitigation in Concrete, *Proceedings of the 14th International Conference on Alkali-Aggregate Reaction*, Austin, TX, May 20-25, 2012.
- 10) Shearer, C. R., Yeboah, N. N. N., Kurtis, K. E., Burns, S. E. (2011). The Early Age Behavior of Biomass Fired and Co-fired Fly Ash in Concrete, *Proceedings of World of Coal Ash Conference, Denver, CO*, May 9-11, 2011. <http://www.flyash.info/2011/017-Shearer-2011.pdf>
- 11) Shearer, C. R., Yeboah, N. N. N., Kurtis, K. E., Burns, S. E. (2010). Investigation of biomass co-fired fly ash properties: Characterization and concrete durability performance, *Proceedings of the Second International Conference on Sustainable Construction Materials and Technologies*, Ancona, Italy, 2010. <http://www.claisse.info/2010%20papers/k39.pdf>

TECHNICAL REPORTS

- 1) Simonton, E.* and Shearer, C. R., (2019). Technical Memorandum: Literature Review on Low Shrinkage Mix Designs to Reduce Early Cracking of Concrete Bridge Decks, *South Dakota Department of Transportation*, Pierre, SD, August 16, 2019.
- 2) Elahi, M. M. A.* and Shearer, C. R., (2019). Study SD2016-04 Final Report: Development of Specifications for Portland-Limestone Cement, *South Dakota Department of Transportation*, Pierre, SD, March 28, 2019.
- 3) Elahi, M. M. A.* and Shearer, C. R., (2017). Technical Memorandum: Literature Review on the Influence of Portland Limestone Cements on Sulfate Attack in Concrete, *South Dakota Department of Transportation*, Pierre, SD, July 24, 2017.

- 4) Shearer, C. R., Shaffner, K. *, and Claggett N. J.* (2016). Isothermal Calorimetry Measurements on Pavements including Admixtures and SCMs, *South Dakota Department of Transportation*, Pierre, SD, August 22, 2016.
- 5) Shearer, C. R., and Kurtis, K. E., *The Productive Reuse of Coal, Co-fired and Biomass Fly Ash as a Supplementary Cementitious Material in Concrete*, Southern Company, Atlanta, GA, 2012.

INVITED PRESENTATIONS

- 1) Shearer, C. R., “Development of Sustainable Infrastructure Materials”, *South Dakota Engineering Society Fall Conference*, South Dakota School of Mines and Technology, Rapid City, SD, Oct. 9, 2014.
- 2) Shearer, C. R., *The Productive Reuse of Biomass Ash and Co-fired Fly Ash in Concrete and Alkali-Activated Geopolymers*, National Institute of Standards and Technology, Gaithersburg, MD, March 26, 2013.
- 3) Shearer, C. R., *An Overview of the European Standard EN 450*, ASTM Committee C-09 on Concrete and Concrete Aggregates Meeting, New Orleans, LA, Dec. 6-8, 2010.
- 4) Shearer, C. R. *, George, J., Smith, N., Ross, A., and Reza, F., “Design for a Swinging Bridge on the Buckeye Trail’s Miami and Erie Canal Towpath”, *ASCE Structures Congress*, Austin, TX, April 30-May 2, 2009.

CONFERENCE AND TECHNICAL PRESENTATIONS

- 1) Elahi, M. M. A. and Shearer, C. R. *, “Improving the sulfate attack resistance of portland-limestone cement through sulfate optimization: A calorimetry-based approach”, *Fifth International Conference on Sustainable Construction Materials and Technologies*, Kingston Upon Thames, United Kingdom, July 14-17, 2019. (conference award winner)
- 2) Simonton, E.* and Shearer, C. R., “Literature review on low shrinkage mix designs to reduce early cracking of concrete bridge decks”, *South Dakota Department of Transportation Technical Panel*, Pierre, SD, June 26, 2019.
- 3) Elahi, M. M. A. and Shearer, C. R. *, “Development of specifications for portland-limestone cement”, *South Dakota Department of Transportation Research Review Board*, Pierre, SD, April 15, 2019.
- 4) Benning, J. *, Surovek, A., Kellogg, S., and Shearer, C. R., “Engagement in practice: A case study on improving community sustainability through service learning”. *2018 ASEE Annual Conference & Exposition*, Salt Lake City, UT, June 24-27, 2018.
- 5) Elahi, M. M. A.* and Shearer, C. R., “Is portland-limestone cement sulfate resistant?”, *The American Ceramic Society 9th Advances in Cement-based Materials Conference*, Pennsylvania State University, State College, PA, June 10-12, 2018.
- 6) Edwards, C. A., Donnell, K. M. *, and Shearer, C. R., “Microwave materials characterization of geopolymer precursor powders”, *2018 IEEE International Instrumentation and Measurement Technology Conference (I2MTC)*. Houston, TX, May 14-17, 2018.
- 7) Elahi, M. M. A.* and Shearer, C. R., “Performance of portland-limestone cement in sulfate environments”, *SD Mines Student Research Symposium*, April 3, 2018.
- 8) Long, A., Benning, J. *, Shearer, C. R., Surovek, A., and Kellogg, S., “Promoting sustainability in engineering through EPICS program”, *15th LACCEI International Multi-Conference for Engineering, Education, and Technology*, Boca Raton, FL, July 19-21, 2017.

- 9) Claggett, N. J. and Shearer, C.R. *, “Mechanical performance of macrosynthetic fiber-reinforced shotcrete mixtures with fibers of varying lengths for use in rock wall stabilization”, *The American Ceramic Society 8th Advances in Cement-based Materials Conference*, Georgia Institute of Technology, Atlanta, GA, June 26-28, 2017.
- 10) Writh, X. *, Shearer, C. R., Burns, S. E., and Kurtis K. E., “Evolution of the properties of organic matter and mineral phases of reclaimed coal fly ash”, *World of Coal Ash Conference*, Lexington, KY, May 9-11, 2017.
- 11) Mahmoodi, M. *, Shearer, C. R., and Donnell, K. M., “Microwave materials characterization of geopolymer materials”, *26th American Society for Nondestructive Testing (ASNT) Spring Research Symposium*, Jacksonville, FL, March 13-16, 2017.
- 12) Shearer, C. R. *, Shaffner, K., Thompson, N. *, Mahmoodi, M., Foudazi, A., Hashemi, A., and Donnell, K., “A new tool for analyzing chemically activated binders: Microwave materials characterization”, *The American Concrete Institute Convention*, Philadelphia, PA, Oct. 23-27, 2016.
- 13) Claggett, N. J.* and Shearer, C. R., “Behavior of high-volume synthetic fiber-reinforced shotcrete with varying fiber lengths”, *The American Concrete Institute Convention*, Philadelphia, PA, Oct. 23-27, 2016.
- 14) Benning, J. *, Surovek, A., Shearer, C. R., and Kellogg, S., “Intellectual diversity and critical thinking skills in service learning”, *Rapid City Sustainability Conference*, Rapid City, SD, Sept. 30, 2016.
- 15) Benning, J. *, Surovek, A., Shearer, C. R., and Kellogg, S., “Building engineering diversity through sustainable design”, Seminar series, Universidad Tecnologica de Panama, Panama City, June 9, 2016.
- 16) Benning, J. *, Surovek, A., Shearer, C. R., and Kellogg, S., “Intellectual diversity and critical thinking skills in service learning”, *University of Colorado Boulder ME Seminar Series*, Boulder, CO, 2016.
- 17) Benning, J. #, Surovek, A., Shearer, C. R., Kellogg, S., and Sawyer, F., “Intellectual diversity and critical thinking skills in service learning”, *University of New Mexico CEE Seminar Series*, Albuquerque, NM, 2016.
- 18) Mahmoodi, M. *, Foudazi, A., Hashemi, A., Shearer, C. R., and Donnell, K. M., “Microwave Assessment of Geopolymer Materials in Plastic and Hardened States”, *The American Society for Nondestructive Testing (ASNT) 25th Research Symposium*, New Orleans, LA, April 11-14, 2016.
- 19) Shearer, C. R., Foudazi, A., Hashemi, A., and Donnell, K. M. *, “Microwave characterization of fly ash geopolymerization”, *International Instrumentation and Measurement Technology Conference*, Taipei, Taiwan, May 23-26, 2016.
- 20) Shearer, C.R. *, “The Changing Nature of Fly Ash and its Reuse”, *Second International Conference on Concrete Sustainability*, Madrid, Spain, June 13-15, 2016.
- 21) Shearer, C. R. *. and Kurtis, K. E., “Scanning transmission X-ray microscopy study on alkali-activated biomass-derived fly ash”, *The American Ceramic Society 6th Advances in Cement-based Materials Conference*, Kansas State University, Manhattan, KS, June 20-22, 2015.
- 22) Shearer, C. R., *Alternative Concrete Materials*, 51st Annual Concrete Conference, South Dakota School of Mines and Technology, Rapid City, SD, March 6, 2015.
- 23) Shearer, C. R. *. and Kurtis, K. E., “The Pozzolanic Reactivity of Biomass and Co-fired Fly Ash”, *The American Concrete Institute Convention*, Phoenix, AZ, Oct. 20-24, 2013.

- 24) Shearer, C. R.* , Ferraris, C., and Kurtis, K. E., “Rheological Study on Coal Fly Ash Geopolymeric Pastes”, *The American Ceramic Society 4th Advances in Cement-based Materials Conference*, University of Illinois at Urbana-Champaign, Urbana, IL, July 8-10, 2013.
- 25) Shearer, C. R.* , Provis, J. L., Bernal, S. A., Kurtis, K. E., “Characterisation of Alkali-activated Co-fired Fly Ash Geopolymers”, *Concrete in the Low Carbon Era Conference*, University of Dundee, Dundee, UK, Aug. 9-11, 2012.
- 26) Shearer, C. R.* , Provis, J. L., Bernal, S. A., Kurtis, K. E., “Co-fired Fly Ash as a Precursor for Geopolymer Production”, *The American Ceramic Society 3rd Advances in Cement-based Materials Conference*, University of Texas at Austin, Austin, TX, June 10-12, 2012.
- 27) Shearer, C. R.* , Yeboah, N. N. N., Burns, S. E., Kurtis, K. E., “Evaluation of Biomass Fired and Co-fired Fly Ash for Alkali-Silica Reaction Mitigation in Concrete”, *14th International Conference on Alkali-Aggregate Reaction*, Austin, TX, May 20-25, 2012.
- 28) Shearer, C. R.* , *Synthesis and Analysis of Co-fired Fly Ash Geopolymers*, EAPSI Debriefing Session, Sydney, Australia, July 29, 2011.
- 29) Shearer, C. R.* , Yeboah, N. N. N., Kurtis, K. E., Burns, S. E., “The Early Age Behavior of Biomass Fired and Co-fired Fly Ash in Concrete”, *World of Coal Ash*, Denver, CO, May 9-12, 2011.
- 30) Shearer, C. R.* , Yeboah, N. N. N., Kurtis, K. E., Burns, S. E., “Investigation of biomass co-fired fly ash properties: Characterization and concrete durability performance”, *Second International Conference on Sustainable Construction Materials and Technologies*, Ancona, Italy, June 28-30, 2010.

CONFERENCE POSTERS

- 1) Reza, A. N. R.* , Thinley, T. L., Donnell, K. M. and Shearer, C. R., “Comparative study of microwave and analytical characterization of alkali activated geopolymers and precursor material”, *The American Ceramic Society 10th Advanced in Cement-based Materials Conference*, University of Illinois at Urbana-Champaign, Urbana, Ill., June 16-18, 2019.
- 2) Reza, A. N. R., Thinley, T. L.* , and Shearer, C. R., “Microwave materials characterization of geopolymer precursor powders in the X-Band and S-Band frequencies of the electromagnetic spectrum”, *SD Mines Student Research Symposium*, April 9, 2019.
- 3) Elahi, M. M. A.* and Shearer, C. R., “Performance studies of portland-limestone cement (PLC) Mortars and Pastes regarding Sulfate Attack”, *SD Mines Student Research Symposium*, April 4, 2017.
- 4) Claggett, N. J.* , Feist, J. J., and Shearer, C. R., “Development of optimal fiber-reinforced shotcrete mix design for use in Sanford Underground Research Facility”, *SD Mines Student Research Symposium*, April 5, 2016.
- 5) Thompson, N.* , Foudazi, A., Mahmoodi, M., Donnell, K. M., and Shearer, C. R., “Characterization of Precursor Powders using Microwave Measurements”, *SD Mines Student Research Symposium*, April 5, 2016.
- 6) Claggett, N. J.* , Shaffner, K. J.* , Feist, J. J., and Shearer, C. R., “Behavior of High Volume Synthetic Fiber-Reinforced Shotcrete with Varying Fiber Lengths”, *The American Ceramic Society 7th Advanced in Cement-based Materials Conference*, Northwestern University, Evanston, Ill., July 10-13, 2016.
- 7) Shearer, C. R.* . and Kurtis, K. E., “Look out cement, there’s a new concrete in town”, *DOE SCFG Annual Research Meeting*, Brookhaven National Laboratory, Upton, NY, July, 2012.
- 8) Shearer, C. R.* , Yeboah, N. N. N., Kurtis, K. E., Burns, S. E., “Characterization of Co-fired Fly Ash Geopolymers”, *Georgia Tech Research and Innovation Conference*, Atlanta, GA, Feb. 7, 2012.

- 9) Shearer, C. R.*, Yeboah, N. N. N., Kurtis, K. E., Burns, S. E., “Characteristics and Potential Uses of Combustion Products Derived from Biomass Co-firing with Coal”, *Georgia Tech Research and Innovation Conference*, Atlanta, GA, Feb. 8, 2011.
- 10) Shearer, C. R.*, Yeboah, N. N. N., Kurtis, K. E., Burns, S. E., “Characterization and Chemical Admixture Interaction of Biomass Co-fired Fly Ash”, *The American Ceramic Society Advances in Cement-based Materials Conference*, Purdue University, West Lafayette, IN, June 11-13, 2010.
- 11) Shearer, C. R.*. and Kurtis, K. E., “Characteristics and Potential Uses of Combustion Products Derived from Biomass Firing and Co-firing”, *Lafarge International Workshop on Materials for Sustainable Construction*, Atlanta, GA, May 4-8, 2009.

FUNDED RESEARCH

- 1) *National Cooperative Highway Research Program (NCHRP)*, “Recommendations for Revision of AASHTO M 295 Standard Specification to Include Marginal and Unconventional Source Coal Fly Ashes”, 8/1/19-7/31/22, \$600,000 (Shearer: \$204,029), PI: Christopher Shearer, Co-PIs: Lisa Burris (Ohio State University), Doug Hooton (University of Toronto), Prannoy Suraneni (University of Miami).
- 2) *South Dakota Department of Transportation (SDDOT)*, “Low Shrinkage Mix Designs to Reduce Early Cracking of Concrete Bridge Decks”, 3/8/19-8/31/19, \$100,000, PI: Christopher Shearer.
- 3) *National Science Foundation (NSF CMMI)*, “The Role of Multi-Scale Porosity on Termite Mound Behavior”, 8/15/18-8/14/21, \$475,000 (Shearer: \$158,333), PI: Bret Lingwall (SD Mines), Co-PIs: Christopher Shearer, Andrea Surovek (SD Mines).
- 4) *South Dakota School of Mines (SD Mines)*, “Reuse of ‘off-spec’ fly ash – PhD support”, 8/18-7/19, \$18,000, PI: Christopher Shearer
- 5) *National Science Foundation (NSF CMMI)*, “Collaborative Research: A Multi-Physics Approach to Advance Sustainable Engineering Materials”, 7/1/17-6/30/20, \$386,739 (Shearer: \$200,000). PI: Christopher Shearer. Missouri Science and Technology PI: Kristen Donnell.
- 6) *National Science Foundation (NSF EEC)*, “RET Site: Sustainable Development-Research Experience for Teachers”, 6/1/17-5/31/20, \$543,466 (Shearer: \$54,347), PIs: Shaobo Huang and Robb Winter (SD Mines), Senior Personnel: Christopher Shearer and 8 others (SD Mines).
- 7) *South Dakota Department of Transportation (SDDOT)*, “Development of Specifications for Portland-Limestone Cement”, 10/14/16-11/30/18, \$85,000, PI: Christopher Shearer.
- 8) *South Dakota Boards of Regents (SDBOR)*, “Performance of Fiber-Reinforced Shotcrete in Mining Applications”, 9/1/15-8/20/16, \$98,056, PI: Christopher Shearer.
- 9) *National Science Foundation (NSF DUE)*, “Collaborative Research: Intellectual Diversity and Critical Thinking Skills in Service Learning”, 9/1/15-8/31/19, \$556,698 (Shearer: \$139,175), PI: Jennifer Benning (SD Mines), Co-PIs: Christopher Shearer (SD Mine), Stu Kellogg (SD Mines), William Oakes (Purdue University), Andrea Surovek (SD Mines).
- 10) *South Dakota School of Mines (SD Mines)*, “Nelson Grant – Preliminary Investigation of Geopolymer Reaction Mechanisms”, 7/1/15-6/30-16, \$5,000, PI: Christopher Shearer
- 11) *Southern Company*, “Energy By-Product Research Development”, Awarded: 1/12/15, PI: Christopher Shearer.

GRADUATE STUDENT ADVISING

Kumar Veluswamy, *PhD Graduate Research Assistant*, SD Mines, 2019-present

Abu Naser Rashid Reza, *PhD Graduate Research Assistant*, SD Mines, 2018-present

Jetsun Leonhardt Ty Thinley, *PhD Graduate Research Assistant*, SD Mines, 2018-present

Eric Simonton, *MS Graduate Research Assistant*, SD Mines, 2019-present

Alexis Long, *MS Graduate Research Assistant*, SD Mines, 2016-present

Md Manjur a Elahi, *MS Graduate Research Assistant*, SD Mines, 2016-2018

Nicholas Claggett, *MS Graduate Research Assistant*, MS, SD Mines, 2015-2017

Kylie Berger, *MS (non-thesis) Graduate Research Assistant*, SD Mines, 2015

UNDERGRADUATE STUDENT AND OTHERS ADVISING

Erica Lafferty, *Undergraduate Research Assistant*, SD Mines, 2019

Jordan Cano, *Undergraduate Research Assistant*, SD Mines, 2019

Bill Swanson, *High School Teacher Researcher*, NSF RET, SD Mines, 2018-2019

Benjamin Love, *Undergraduate Research Assistant*, SD Mines, 2018

Jolene Kayser, *High School Teacher Researcher*, NSF RET, SD Mines, 2017

Nicole Thompson, *Undergraduate Research Assistant*, SD Mines, 2016-2017

Kenneth Shaffner, *Undergraduate Research Assistant*, SD Mines, 2016-2017

Vaughn Vargas, *Undergraduate Assistant*, EPICS, SD Mines, 2016-2017

Jeremy Feist, *Undergraduate Research Assistant*, SD Mines, 2016

Michael Dollarhide, *Undergraduate Research Assistant*, SD Mines, 2014-2015

Ten Undergraduate Research Assistants, Georgia Tech, 2010-2013

PROFESSIONAL ACTIVITIES

Memberships

American Society of Civil Engineers, since 2004

- SD Mines Advisor
- Liaison between local/state chapter and student chapter

American Concrete Institute, since 2008

- President of ACI Dakota Chapter
- ACI 232 Committee (Fly Ash in Concrete) – Voting Member
- ACI 236 Committee (Material Science of Concrete) – Associate Member
- ACI 242 Committee (Alternative Cements) - Associate Member
- Annual Concrete Conference Organizer at SD Mines

The American Ceramic Society, since 2010

South Dakota Engineering Society, since 2017

- University Relations Liaison

American Society for Engineering Education, since 2012

Tau Beta Pi (Engineering Honor Society), since 2006

Chi Epsilon, since 2016

Journal Reviewer

Advances in Civil Engineering Materials

ACI Materials Journal

ACI Special Publication

Construction and Building Materials

Cement and Concrete Composites

Journal of Materials in Civil Engineering (ASCE)

Materials and Structures

Waste and Biomass Valorization

Resources, Conservation & Recycling

UNIVERSITY SERVICE

American Society of Civil Engineers Faculty Advisor, SD Mines, 2015-present

Concrete Canoe Team Faculty Advisor, SD Mines, 2014-present

Strategic Planning Committee, SD Mines, 2018-2019

Student Research Symposium Judge, SD Mines, 2015-2016

Recruitment, SD Mines, 2014-present

Faculty Search Committee, SD Mines, 2014-2015, 2016-2017

Center for the Enhancement of Teaching and Learning Orientation Panel Member, Georgia Tech, 2012

AWARDS AND HONORS

- Black Hills Young Engineer of the Year, Nominee, South Dakota Engineering Society, 2019
- Chi Epsilon, 2017
- American Society of Civil Engineers ExCEED Fellow, 2015
- Kiewit Faculty Scholar, 2015
- Department of Energy Office of Science Graduate Fellowship, 2010-2013
- Georgia Tech President's Fellowship, 2008-2013
- American Concrete Institute Presidents' Fellowship, 2010-2011
- National Science Foundation East Asia & Pacific Summer Institutes (EAPSI) Award, University of Melbourne, Australia, 2011
- World of Coal Ash Student Presentation Award, Denver, CO, 2011
- Georgia Tech Research & Innovation Conference Poster Award, Atlanta, GA, 2011
- The American Ceramic Society Student Poster Award, Advances in Cement-based Materials Conference, Purdue University, 2010
- American Concrete Institute Scholarship, 2009-2010
- First Place, American Society of Civil Engineers Structural Engineering Institute, Student Design Award, 2009
- Tau Beta Pi Fellowship – Fife Fellow, 2008-2009
- Ohio Northern University Presidential Merit Scholarship, 2004-2008
- Tau Beta Pi Scholarship, 2007-2008

- Ohio Northern University Recognition Medal – Highest Ranking Graduate in the College of Engineering, 2008
- Washington Group International Scholarship, 2007-2008
- Remsburg Award – Most Innovative Senior Design Project, Ohio Northern University, 2008
- American Society of Civil Engineers Outstanding Project Leader Award, Ohio Northern University, 2008

CERTIFICATIONS

Engineer in Training (E.I.T.), Ohio Professional Engineers and Surveyors Board, 2008

ACI Certified Concrete Strength Testing Technician, 2015

ACI Certified Concrete Field Testing Technician – Grade I, 2015